DOCUMENT RESUME

ED 255 788 CG 018 120

AUTHOR Eshelman, Anne K.
TITLE Prediction and Modification of Compliance in Weight Management.
PUB DATE Aug 84
NOTE 18p.; Paper presented at the Annual Convention of the American Psychological Association (92nd, Toronto, Ontario, Canada, August 24-28, 1984).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Behavior Modification; Body Weight; Cognitive Restructuring; Contingency Management; Females; *Motivation; *Motivation Techniques; *Predictor Variables; Termination of Treatment
IDENTIFIERS *Compliance (Behavior); Expectancy Theory; *Weight Loss

ABSTRACT

Understanding the dynamics of premature termination from treatment would be useful for practitioners working with clients requiring prolonged treatment. Compliance in weight management was examined in three studies in order to explore the broader issue of compliance. In study 1, a standard 10-week cognitive behavioral weight management program was compared to three specific interventions to increase motivation: monetary contingency contracting (MC), cognitive modification of expectancies (CM), and a combination of both. Subjects were 52 women (aged 20-63) who signed up for the groups according to time preference. The results showed that, as predicted, these interventions decreased dropout and improved weight outcome; differences between groups were not significant. In study 2, motivational variables from expectancy theory were combined with demographic and psychological variables in multiple regression analyses to predict attendance and outcome. Subjects were 27 women (aged 24-69), attending an 8-week weight control class, and the 52 subjects from study 1. One combination of motivational variables, the force to stay and the force to leave, was found to be significantly predictive of attendance. Attendance was highly correlated with outcome, but no combination of variables was predictive of outcome at post-test. In study 3, t-tests were used to analyze differences between a no-measure control group (N=10) and the prediction-only sample (N=27) on attendance and weight outcome. No significant differences were found. Eighteen references are listed. (MCF)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED255788

Prediction and Modification of Compliance in Weight Management

Anne K. Eshelman
Henry Ford Hospital
Detroit, Michigan

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Anne K. Eshelman

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

This article is based on Anne K. Eshelman's doctoral dissertation, which was supervised by Edward C. Podany and Mark Goldman at Wayne State University. Presented at the meeting of the American Psychological Association, Toronto, Ontario, 1984. Appreciation is expressed to members of the dissertation committee, Joel Ager, Patricia Natale, and Hjalmar Rosen for their help and guidance. Special thanks are due to the staffs of Henry Ford Hospital and the University Health Center for their cooperation.

Send reprint requests to: Anne Eshelman, Consultation Psychiatry CFP-3, Henry Ford Hospital, 2799 W. Grand Blvd., Detroit, Michigan 48202.

CG 018120

ABSTRACT

The expectancy-valence theory of motivation was applied to weight control in an effort to predict and control compliance and outcome. In Study 1 specific interventions to increase motivation were compared to a standard ten week cognitive behavioral weight management program. Interventions included monetary contingency contracting (MC), a cognitive modification of expectancies (CM) and a combination of both. It was thought that these interventions might decrease dropout and improve weight outcome at post-test and followup. Differences between groups were in the predicted direction, but nonsignificant.

Motivational variables from expectancy theory were combined with demographic and psychological variables to predict compliance and outcome in Study 2. Two motivational variables were predictive of attendance, which was highly correlated with outcome. However, no combination of variables was predictive of outcome at post-test or followup. In Study 3, the measures were not found to be reactive with respect to attendance or outcome.

The results were discussed in an evaluation of the expectancy model. The model assumes that individuals are consciously aware of factors that determine their behavior, rationally assess the anticipated costs and benefits before behaving, and that this assessment, once made, remains constant. In addition, it is assumed that people can and will reproduce this decision process for the investigator on demand. Violations of these assumptions limit the predictive utility of the model. Prediction of overall adherence is a function of many smaller, daily behavioral choices. Intent to persevere may be undermined by the attraction of immediate self-mediated rewards and

difficulty altering environmental contingencies to support new behavior. The same factors which reduce compliance with weight control programs may make adherence more difficult to predict. Obesity is a chronic problem, requiring complex and extensive behavioral changes over a long period of time. There may be adverse side effects of treatment and the costs of noncompliance are not dramatic or immediate.

The motivation measure used in this study may identify important individual factors affecting compliance. Perhaps rather than focusing on changing perceptions or cognitive expectancies, effort should be exerted to more actively change the individual's environmental contingencies.

INTRODUCTION

Premature termination from treatment is a significant concern of psychologists and physicians treating patients with chronic medical or psychological disorders requiring prolonged treatment. Baekeland and Lundwall (1975) have reviewed the literature on compliance with psychological treatment; reviews of compliance with medical regimens are found in Blackwell (1972, 1973) and Haynes (1976). Although there are many conflicting findings, demographic characteristics and a wide variety of psychological variables have not been predictive of compliance over and above the base rates of dropping out. Features of the therapeutic regimen and sociobehavioral features have also been explored. Patients are less likely to follow through with treatments which require more extensive behavioral changes, are more complex, require effort over a long period of time or have adverse side effects.

Compliance in weight management was chosen as a specific example of the broader issue of compliance. Obesity is a prevalent problem which 1) can present serious medical risks, 2) which can be treated effectively using a variety of techniques if compliance with treatment is assured, and 3) which persists nonetheless. Understanding the dynamics involved in dropout and exploring factors which might reduce it would have considerable utility for practitioners and clients in treatment of obesity, as well as other disorders. Reviews of the literature on treatments for obesity may be found in Brownell and Venditti (1982), Jeffery, Wing and Stunkard (1978), and Powers (1982).

MOTIVATION THEORY

It was suggested that client motivation might be an important factor in compliance. Careful assessment and modification of motivation were expected to lead to improved compliance and outcome. Expectancy-valence theory of motivation (Vroom, 1964), a comprehensive motivational model, has been found to predict occupational preference, job satisfaction and job effort in industrial settings. This model incorporates a number of cognitive expectancies, expectancy, instrumentality, and valence. Expectancy refers to the general expectancy that with effort the individual can reach a desired goal, similar to Bandura's (1977) notion of self-efficacy. Instrumentality is the subjective assessment that valued outcomes are contingent on performance. In addition to these expectancies it is also important to consider the subjective costs and benefits of those outcomes thought to be contingent on performance. Increasing valued rewards, increasing self-efficacy and awareness of the contingency are not sufficient to increase effort if the individual anticipates that negative outcomes are dependent on the same behaviors. An individual would be motivated to perform a specific behavior only if the expected rewards of doing so outweighed the costs and if the net effect was perceived as more advantageous than other behaviors available in that situation. This is an ipsative choice model, predicting within individuals by comparing forces in opposing directions, for example the force to persevere versus the force to quit.

A series of three studies was designed to explore the problem of compliance in weight control programs.

MODIFICATION OF COMPLIANCE

In Study 1, the issue of modification of compliance was addressed by comparing two interventions to improve compliance in a four group, 2 x 2 analysis of variance design. The first intervention involved a strictly operant reinforcement model using strong monetary contingencies, based on Jeffery, Thompson and Wing's (1978) work. Monetary contingency groups (MC) deposited $100 at the beginning of the ten week weight program, and could receive a full refund if they met or exceeded the weight goals they set. If they did not reach their goals, the money was forfeited to a charity or cause which they selected but would not ordinarily support.

The second intervention involved awareness and modification of cognitive expectancies, based on a combination of cognitive models including expectancy theory of motivation (Vroom, 1964), attribution theory (Kelley and Michela, 1980) and the concept of self-efficacy (Bandura, 1977, 1980). The cognitive modification of expectancies groups (CM) participated in discussions and homework assignments designed to enhance motivation by (1) increasing the expectancy that one could, with effort complete the program, develop new behaviors and lose weight, (2) strengthening behavior-reward contingencies, and (3) assessing and modifying negative outcomes thought to be contingent on weight loss. It was thought that these interventions might significantly reduce dropout, and improve attendance and weight loss.

Method

Subjects were 52 women, ages 20 to 63 (mean = 38), participating in a ten week cognitive-behavioral weight management program. Their initial weight ranged from 128 to 288 pounds (mean = 191.5). Subjects met in groups of about ten for weekly 90-minute sessions led by advanced graduate students at Wayne State University. Subjects and group leaders signed up for groups according to their time preferences. The four treatment combinations, monetary contingency (MC), cognitive modification (CM), both MC and CM, and the standard treatment, were randomly assigned to groups.

Subjects completed questionnaires at three times: pre-test (week 1), post-test (week 10) and three month followup. Measures included the Stanford Eating Disorders Questionnaire (Agras, Ferguson, Greaves, Qualls, Rand, Ruby, Stunkard, Taylor, Werne, and Wright, 1976) which was designed as a standardized data set for obesity research. Short forms of the Taylor Manifest Anxiety Scale (Taylor, 1953) and the Beck Depression Inventory (Beck, Ward, Mendelson, Mock and Erbaugh, 1961) were included in order to assess any negative emotional side effects of treatment. A self-report inventory, the Problem Eating Behavior Checklist, was used to assess behavior change. Outcome was reported in pounds lost and two weight reduction indices (Wilson, 1978).

Results

A 2 x 2 analysis of variance yielded no significant differences in number of sessions attended, or weight loss outcome. Differences between groups were in the predicted direction, as Table 1 and Figure 1 show. None of the treatments led to untoward emotional side effects and subjects showed decreased anxiety, depression and problem eating behaviors at post-test and followup as compared to pre-test (Figure 2).

TABLE 1

Mean Weight Loss in Pounds at Post-test and Followup by Group

Group	Post-test	Followup
Monetary Contingency	8.2	5.3
Cognitive Modification	8.05	8.7
MC + CM	10.1	7.1
Standard Treatment	3.7	1.9

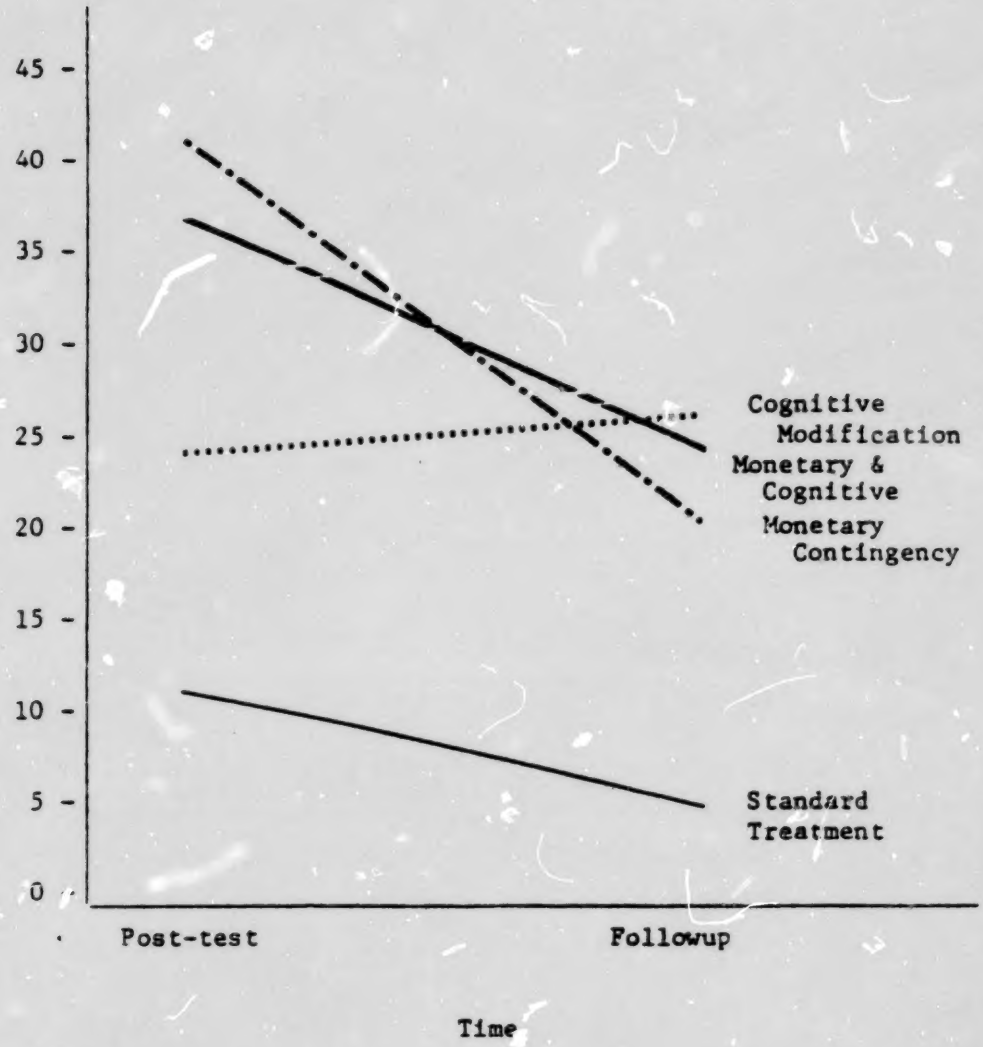

FIGURE 1

Percent of Goal Weight Attained at Post-test and Followup by Group

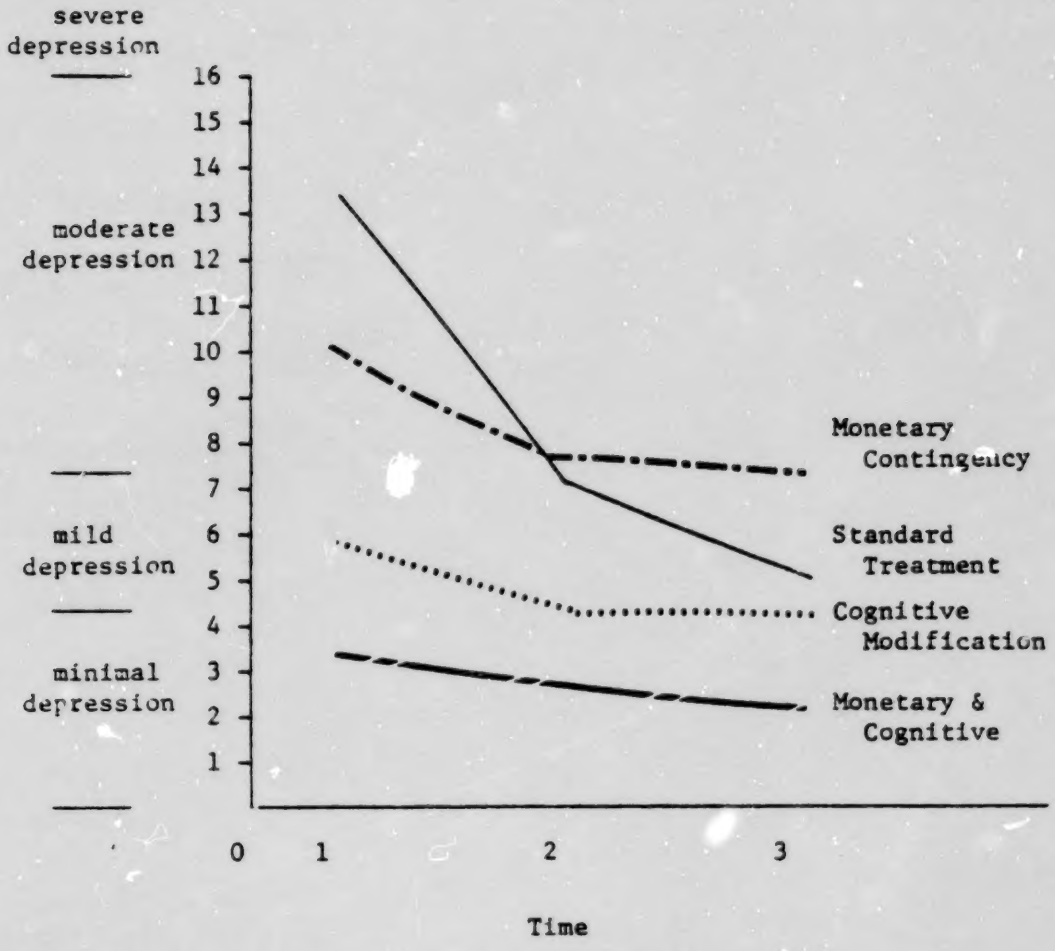

FIGURE 2

Mean Scores on the Beck Depression Inventory by Groups Over Time

PREDICTION

In Study 2, motivational variables from expectancy theory were combined with demographic and psychological variables in multiple regression analyses in order to predict attendance and outcome. Individuals were expected to adhere to the weight program to the extent that their subjective anticipated rewards of doing so outweighed the anticipated costs.

Method

In addition to the 52 subjects who participated in Study 1, 27 women (ages 24-69) attending an eight week weight control class taught by registered dieticians, participated in Study 2. Subjects' initial weight ranged from 137 pounds to 258 pounds (mean=187.3). In comparing the two samples, sample 1 (N=52) was younger, better educated, more racially mixed, had been obese longer, and functioned at a higher occupational level. The two samples were combined for this analysis, yielding a total of 79 subjects. Subjects filled out the same questionnaires discussed in Study 1. In addition, a motivation measure was developed for this study based on expectancy theory.

Results

One combination of motivation variables, the force to stay and the force to leave, was found to be significantly predictive of attendance, although the predictive utility was low due to a limited percentage of variance accounted for (8%). See Table 2. Attendance was highly correlated with outcome, but none of the motivational, demographic or psychological variables were found to be significantly predictive of weight outcome at post-test or followup, individually or in combination.

REACTIVITY OF THE MEASURES

T-tests were used to analyze differences between a no-measure control group (N=10), and the prediction-only sample (N=27) on attendance and weight outcome. No significant differences were found.

TABLE 2

Multiple Regression Analysis of Predictor Variables to Attendance

Full Predictor Set		MR	R^2	AR^{2a}	F	*F
Step	Predictors					
1	Education, marital status, age, obesity onset	.30	.09	-.01	.89	.53
2	Number of weight loss attempts, medical risks	.35	.12	-.01	.93	.52
3	Anxiety, depression, problem eating behavior	.37	.14	-.04	.78	.67
4a)	Expectancy, stay assists, stay barriers, leave assists, leave barriers	.48	.23	.00	1.02	.46
4b)	Force to stay, force to leave	.48	.23	.04	1.23	.27
4c)	Number of benefits of staying, leaving, number of costs of staying, leaving	.44	.2	.03	.88	.60
Reduced Predictor Set						
a)	Expectancy, stay assists, stay barriers, leave assists, leave barriers	.34	.12	.06	1.96	.09
b)	Force to stay, force to leave	.33	.11	.08	4.61	.01*
c)	Number of benefits of staying, leaving, number of costs of staying, leaving	.28	.08	.03	1.6	.19

[a]Adjusted R^2, after shrinkage

DISCUSSION AND CONCLUSIONS

The expectancy valence model of motivation assumes that individuals are consciously aware of the factors that determine their behavior, that they rationally assess the anticipated costs and benefits before behaving and that this assessment, once made, remains constant. In addition, it is assumed that people can and will accurately and reliably reproduce this decision process for the investigator on demand. To the extent that these assumptions are inaccurate, prediction of behavior will be compromised.

The vast literature on psychotherapy suggests that people are often not able to identify maladaptive overt behavior patterns, much less the factors that determine their behavior. Individuals often behave without regard for logic, or make many rationally sound resolutions that in a very short time are forgotten and never executed.

Successful weight control requires delay of immediate gratification, resistance of the short-term pleasure of eating in exchange for anticipated long-term improvements in appearance, health, relationships, activities or other benefits. During the interval between deciding to forego the immediate gratification of uncontrolled eating and receiving the long-term benefits, one may abandon her choice and accept those short-term rewards. The short-term rewards (food) are self-mediated and therefore familiar and certain, while the delayed rewards are likely to be to some extent environmentally mediated and may be less certain. The pre-existing environmental contingencies do not support behavior change, the contingencies may be unclear, and the individual, to a large extent is responsible for changing them, which may be a formidable task. While the individual may think she can successfully resist temptation and delay gratification, she may be unaware of the extent to which her behavior is under the control of familiar external cues. As

Blackwell (1973) has pointed out, the complexity of the treatment regimen has been significantly related to compliance with medical treatments. Since weight control demands extensive long-term changes in behavior and thought patterns, it is not surprising that compliance is a major problem.

While individuals do make overall adherence decisions to start or drop out of treatment, total adherence is a function of many smaller decisions made repeatedly on a day-to-day basis--decisions about food, exercise, attendance, homework, participation in group discussions and many other aspects of their behavior. From such data as the number of previous attempts many obese people have made to lose weight, and from the problem of weight gain during the maintenance phase of successful reduction programs, it is clear that daily specific behavioral decisions do not follow automatically from an overall decision to persevere, and may be very difficult to predict.

Attitudes toward weight control, and motivational factors may be quite unstable, fluctuating with changes in environmental supports or pressures. Measurement at any given point in time may only predict for the very immediate future. Perhaps more needs to be done to insure greater consistency between the overall resolution to change and daily behavioral decisions, in order to prevent return to immediate gratification. Studies which have decreased reliance on self-control and self-reward through active modification of environmental contingencies have shown promise. Brownell and Kaye (1982) have reported very positive findings in treating 5 to 12 year old children in the school setting. Similarly, enlisting cooperation and support through couples training may be very effective for some partners (Brownell, Heckerman, Westlake, Hayes and Monti, 1978).

The differential effects of environmentally mediated versus self-mediated rewards may also explain why prediction of behavior is less successful in weight control programs than in the industrial settings to which expectancy theory has been applied. It may be relatively easy to assess the instrumentality of increased effort leading to tangible rewards which an organization wants to be perceived as contingent upon behavior. This task may involve very little subjectivity and little variability between or within individuals over time. The decision to work harder may closely approximate a logical weighing of the costs and benefits of each choice.

In the behavior change arena, however, the contingencies and rewards may be less clear. Some rewards may be self-mediated. Others are multi-determined, and may not follow directly from adherence to the treatment plan or weight loss. For these reasons, there may be more variability in expectancies within an individual over time, leading to less predictability in behavior.

Is it reasonable to expect that subjects can and will accurately and reliably reproduce their decision making processes on demand? Perhaps the task of identifying and assessing the costs and benefits of one's behavior is too complex for those without more extensive training in this analytic process. It may be especially difficult in a clinical situation where contingencies may be unstable and unclear.

The motivation measure used in this study may identify important factors affecting compliance. Perhaps rather than focusing on changing perceptions or cognitive expectancies, it would be more fruitful to use this information to change the individual's environmental contingencies.

Although the results of this series of studies does not strongly support the efficacy of analysis and modification of cognitive expectancies, this approach may yet be of value if used within a more individualized context.

Since the results were in the predicted direction, a more intensive program with a larger subject sample might yield stronger effects. It may be useful to discuss contingencies and rewards not only with the obese person, but with members of his or her social network. In this way, other aspects of multi-determined outcomes could be addressed and family members could see more clearly how they can help effect change.

Psychological factors as yet have not been very useful in predicting or modifying compliance with treatment. Perhaps we need to widen the search to include physiological determinants and their interactions with psychological factors.

REFERENCES

Agras, W. S., Ferguson, J., Greaves, C., Qualls, B., Rand, C., Ruby, J., Stunkard, A., Taylor, C., Werne, J., and Wright, C. A clinical and research questionnaire for obese patients. In B. Williams, S. Martin and J. Foreyt (Eds.), Obesity: Behavioral approaches to dietary management. New York: Brunner/Mazel, 1976.

Baekeland, F., and Lundwall, L. Dropping out of treatment: A critical review. Psychological Bulletin, 1975, 82(5), 733-83.

Bandura, A. Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 1977, 84, 191-215.

Bandura, A. Reflections on self-efficacy. In C. M. Franks and G. T. Wilson (Eds.), Annual review of behavior therapy theory and practice, 1979 (Vol. 7). New York: Brunner/Mazel, 1980.

Beck, A., Ward, C., Mendelson, M., Mock, J., and Erbaugh, J. An inventory for measuring depression. Archives of General Psychiatry, 1961, 4, 561-571.

Blackwell, B. The drug defaulter. Clinical Pharmacological Therapy, 1972, 13, 841-848.

Blackwell, B. Patient compliance. New England Journal of Medicine, 1973, 289 (5), 249-252.

Brownell, K., Heckerman, C., Westlake, R., Hayes, S., and Monti, P. The effect of couples training and partner cooperativeness in the behavioral treatment of obesity. Behaviour Research and Therapy, 1978, 16, 323-333.

Brownell, K., and Kaye, F. A school based behavior modification, nutrition education and physical activity program for obese children. American Journal of Clinical Nutrition, 1982, 35, 277-283.

Brownell, K., and Venditti, E. The etiology and treatment of obesity. In W. Fann, I. Karacam, A. Pokorny, and R. Williams (Eds.), Phenomenology and treatment of psychophysiological disorders. New York: Spectrum Publications, 1982.

Haynes, R. B. A critical review of the "determinants" of patient compliance with therapeutic regimens. In D. L. Sackett and R. B. Haynes (Eds.), Compliance with therapeutic regimens. Baltimore: Johns Hopkins University Press, 1976.

Jeffery, R.W., Thompson, P. D., and Wing, R. R. Effects on weight reduction of strong monetary contracts for calorie restriction or weight loss. Behaviour Research and Therapy, 1978, 9, 189-199.

Jeffery, R. W., Wing, R. R., and Stunkard, A. J. Behavioral treatment of obesity: The state of the art in 1976. Behavior Therapy, 1978, 9, 189-199.

Kelley, H. H. and Michela, J. L. Attribution theory and research. Annual Review of Psychology, 1980, 31, 457-501.

Powers, P. Obesity: Psychosomatic illness review. Psychosomatics, 1982, 23, (10), 1023-1039.

Taylor, J. A personality scale of manifest anxiety. Journal of Abnormal Social Psychology, 1953, 48, 285-290.

Vroom, V. Work and Motivation. New York: John Wiley & Sons, 1964.

Wilson, G. T. Methodological considerations in treatment outcome research on obesity. Journal of Consulting and Clinical Psychology, 1978, 46(4), 687-702.